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WHAT IS CLAIMED IS:

*R. Sub* 1. An isolated nucleic acid encoding a sensory transduction G-protein coupled receptor, the receptor comprising greater than about 70% amino acid identity to an amino acid sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

2. The isolated nucleic acid of claim 1, wherein the nucleic acid encodes a receptor that specifically binds to polyclonal antibodies generated against SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

10 3. The isolated nucleic acid of claim 1, wherein the nucleic acid encodes a receptor that has G-coupled protein receptor activity.

15 4. The isolated nucleic acid of claim 1, wherein the nucleic acid encodes a receptor comprising an amino acid sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

20 5. The isolated nucleic acid sequence of claim 1, wherein the nucleic acid comprises a nucleotide sequence of SEQ ID NO:4, SEQ ID NO:5, or SEQ ID NO:6.

6. The isolated nucleic acid of claim 1, wherein the nucleic acid is from a human, a mouse, or a rat.

25 7. The isolated nucleic acid of claim 1, wherein the nucleic acid is amplified by primers that selectively hybridize under stringent hybridization conditions to the same sequence as degenerate primer sets encoding amino acid sequences selected from the group consisting of:

IAWDWNGPKW (SEQ ID NO:7) and  
LPENYNNEAKC (SEQ ID NO:8).

30 8. The isolated nucleic acid of claim 1, wherein the nucleic acid encodes a receptor having a molecular weight of about between 92 kDa to about 102 kDa.

*Sub A2* 9. An isolated nucleic acid encoding a sensory transduction G-protein coupled receptor, wherein the nucleic acid specifically hybridizes under highly stringent conditions to a nucleic acid having the sequence of SEQ ID NO:4, SEQ ID NO:5, or SEQ ID NO:6.

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10. An isolated nucleic acid encoding a sensory transduction G-protein coupled receptor, the receptor comprising greater than about 70% amino acid identity to a polypeptide having a sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3, wherein the nucleic acid selectively hybridizes under moderately stringent hybridization conditions to a nucleotide sequence of SEQ ID NO:4, SEQ ID NO:5, or SEQ ID NO:6.

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11. An isolated nucleic acid encoding an extracellular domain of a sensory transduction G-protein coupled receptor, the extracellular domain having greater than about 70% amino acid sequence identity to the extracellular domain of SEQ ID NO:1.

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12. The isolated nucleic acid of claim 11, wherein the nucleic acid encodes the extracellular domain linked to a nucleic acid encoding a heterologous polypeptide, forming a chimeric polypeptide.

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*Sub A3* 13. The isolated nucleic acid of claim 11, wherein the nucleic acid encodes the extracellular domain of SEQ ID NO:1.

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14. An isolated nucleic acid encoding a transmembrane domain of a sensory transduction G-protein coupled receptor, the transmembrane domain comprising greater than about 70% amino acid sequence identity to the transmembrane domain of SEQ ID NO:1.

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15. The isolated nucleic acid of claim 14, wherein the nucleic acid encodes the transmembrane domain linked to a nucleic acid encoding a heterologous polypeptide, forming a chimeric polypeptide.

*Sub A4*

16. The isolated nucleic acid of claim 14, wherein the nucleic acid encodes the transmembrane domain of SEQ ID NO:1.

17. The isolated nucleic acid of claim 14, wherein the nucleic acid further encodes a cytoplasmic domain comprising greater than about 70% amino acid identity to the cytoplasmic domain of SEQ ID NO:1.

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18. The isolated nucleic acid of claim 17, wherein the nucleic acid encodes the cytoplasmic domain of SEQ ID NO:1.

10 19. An isolated sensory transduction G-protein coupled receptor, the receptor comprising greater than about 70% amino acid sequence identity to an amino acid sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

15 20. The isolated receptor of claim 19, wherein the receptor specifically binds to polyclonal antibodies generated against SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

21. The isolated receptor of claim 19, wherein the receptor has G-protein coupled receptor activity.

20 22. The isolated receptor of claim 19, wherein the receptor has an amino acid sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

25 23. The isolated receptor of claim 19, wherein the receptor is from a human, a rat, or a mouse.

24. An isolated polypeptide comprising an extracellular domain of a sensory transduction G-protein coupled receptor, the extracellular domain comprising greater than about 70% amino acid sequence identity to the extracellular domain of SEQ ID NO:1.

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25. The isolated polypeptide of claim 24, wherein the polypeptide encodes the extracellular domain of SEQ ID NO:1.

26. The isolated polypeptide of claim 24, wherein the extracellular domain is covalently linked to a heterologous polypeptide, forming a chimeric polypeptide.

5 27. An isolated polypeptide comprising a transmembrane domain of a sensory transduction G-protein coupled receptor, the transmembrane domain comprising greater than about 70% amino acid sequence identity to the transmembrane domain of SEQ ID NO:1.

10 28. The isolated polypeptide of claim 27, wherein the polypeptide encodes the transmembrane domain of SEQ ID NO:1.

15 29. The isolated polypeptide of claim 27, further comprising a cytoplasmic domain comprising greater than about 70% amino acid identity to the cytoplasmic domain of SEQ ID NO:1.

30. The isolated polypeptide of claim 29, wherein the polypeptide encodes the cytoplasmic domain of SEQ ID NO:1.

20 31. The isolated polypeptide of claim 27, wherein the transmembrane domain is covalently linked to a heterologous polypeptide, forming a chimeric polypeptide.

25 32. The isolated polypeptide of claim 31, wherein the chimeric polypeptide has G-protein coupled receptor activity.

33. An antibody that selectively binds to the receptor of claim 19.

34. An expression vector comprising the nucleic acid of claim 1.

30 35. A host cell transfected with the vector of claim 34.

36. A method for identifying a compound that modulates sensory signaling in sensory cells, the method comprising the steps of:

(i) contacting the compound with a polypeptide comprising an extracellular domain of a sensory transduction G-protein coupled receptor, the extracellular domain comprising greater than about 70% amino acid sequence identity to the extracellular domain of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3; and

5 (ii) determining the functional effect of the compound upon the extracellular domain.

37. The method of claim 36, wherein the polypeptide is a sensory transduction G-protein coupled receptor, the receptor comprising greater than about 70%  
10 amino acid identity to a polypeptide encoding SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

15 38. The method of claim 37, wherein the polypeptide comprises an extracellular domain that is covalently linked to a heterologous polypeptide, forming a chimeric polypeptide.

39. The method of claim 37 or 38, wherein the polypeptide has G-protein coupled receptor activity.

20 40. The method of claim 36, wherein the extracellular domain is linked to a solid phase.

25 41. The method of claim 40, wherein the extracellular domain is covalently linked to a solid phase.

42. The method of claim 37 or 38, wherein functional effect is determined by measuring changes in intracellular cAMP, IP<sub>3</sub>, or Ca<sup>2+</sup>.

30 43. The method of claim 36, wherein the functional effect is a chemical effect.

44. The method of claim 36, wherein the functional effect is a physical effect.

45. The method of claim 36, wherein the functional effected is determined by measuring binding of the compound to the extracellular domain.

5 46. The method of claim 36, wherein the polypeptide is recombinant.

47. The method of claim 36, wherein the polypeptide is from a rat, a mouse, or a human.

10 48. The method of claim 37, wherein the polypeptide comprises an amino acid sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.

49. The method of claim 37 or 38, wherein the polypeptide is expressed in a cell or cell membrane.

15 50. The method of claim 49, wherein the cell is a eukaryotic cell.

51. A method for identifying a compound that modulates sensory signaling in sensory cells, the method comprising the steps of:

20 (i) contacting the compound with a polypeptide comprising an extracellular domain of a sensory transduction G-protein coupled receptor, the transmembrane domain comprising greater than about 70% amino acid sequence identity to the extracellular domain of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3; and

(ii) determining the functional effect of the compound upon the transmembrane domain.

25 52. The method of claim 51, wherein the polypeptide comprises an transmembrane domain that is covalently linked to a heterologous polypeptide, forming a chimeric polypeptide.

30 53. The method of claim 52, wherein the chimeric polypeptide has G-protein coupled receptor activity.

54. The method of claim 51, wherein the functional effect is determined by measuring changes in intracellular cAMP, IP<sub>3</sub>, or Ca<sup>2+</sup>.

55. The method of claim 51, wherein the functional effect is a chemical effect.
- 5 56. The method of claim 51, wherein the functional effect is a physical effect.
- 10 57. The method of claim 51, wherein the polypeptide is recombinant.
- 15 58. The method of claim 51, wherein the polypeptide is from a rat, a mouse, or a human.
- 20 59. The method of claim 51 or 52, wherein the polypeptide is expressed in a cell or cell membrane.
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AS-* 60. The method of claim 59, wherein the cell is a eukaryotic cell.
- 30 61. A method of making a sensory transduction G-protein coupled receptor, the method comprising the step of expressing the receptor from a recombinant expression vector comprising a nucleic acid encoding the receptor, wherein the amino acid sequence of the receptor comprises greater than about 70% amino acid identity to a polypeptide having a sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.
62. A method of making a recombinant cell comprising a sensory transduction G-protein coupled receptor, the method comprising the step of transducing the cell with an expression vector comprising a nucleic acid encoding the receptor, wherein the amino acid sequence of the receptor comprises greater than about 70% amino acid identity to a polypeptide having a sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.
63. A method of making an recombinant expression vector comprising a nucleic acid encoding a sensory transduction G-protein coupled receptor, the method comprising the step of ligating to an expression vector a nucleic acid encoding the receptor, wherein the amino acid sequence of the receptor comprises greater than about

70% amino acid identity to a polypeptide having a sequence of SEQ ID NO:1, SEQ ID NO:2, or SEQ ID NO:3.